

BOTANY.—*Elongation of mesocotyls and internodes in Job's-tears* (*Coix lachryma-jobi* L.).¹ JAMES H. KEMPTON, U. S. Bureau of Plant Industry.

Numerous experiments with maize seedlings grown in the dark have shown that the elongation of the mesocotyl (epicotyl) ceases with the exertion from the coleoptile of the first leaf. It has been established also that 100 F.C. hours Mazda illumination at approximately 26° C., when the seedlings are 2 to 5 cm tall, result in a reduction in the final length of the mesocotyl of approximately 25 to 30 percent. When the mesocotyl has attained the length maximum for the seed stock and the experimental conditions, further elongation of the seedling takes place in the first internode—the internode between the coleoptile and the first leaf.

Seedlings of the Asiatic maize relative, *Coix lachryma-jobi* L., differ morphologically from those of maize in having a bladeless sheath interposed between the coleoptile and the first true leaf. It was of interest, therefore, to determine for *Coix* whether cessation of elongation of the mesocotyl awaited the appearance of the first true leaf or followed upon the exertion of the bladeless sheath.

Coix is native to the Oriental humid tropics of very heavy rainfall and may be considered at least semiaquatic in habitat. Importation of seed from the Orient is proscribed because of the prevalence there of a mildew capable of attacking maize. However, the hard-shelled forms have been grown in this country for years as a source of beads, and a stock of this seed was obtained from the W. Atlee Burpee Co.

Preliminary experiments showed that the seedlings of this stock, when grown in the dark, produced mesocotyls almost twice the length of those of the Funk Yellow Dent used in maize experiments. Mesocotyls as long as 450 mm were obtained, and this length at least equals that found in the desert maize of the Hopi Indians.² In the case of the Hopi maize, long mesocotyls are an evident adaptation to the deep planting required to place the seed in moist soil, whereas in *Coix* they may be considered as a useful adaptation for an aquatic habitat where the seeds may be buried along stream banks.

The experiments with *Coix* indicated that, with the exertion of the bladeless sheath from the coleoptile, the elongation of the mesocotyl ceased. However, it developed that upon the cessation of elongation of the mesocotyl further elongation of the seedling took place at

¹ Received March 25, 1941.

² COLLINS, G. N. *A drought-resisting adaptation in seedlings of Hopi maize*. Journ. Agr. Res. 1: 293-301, illus. Jan. 10, 1914.

the second internode instead of the first as in maize. The first internode was not extended and the coleoptile and bladeless sheath remained essentially paired as almost opposite organs (Fig. 1).

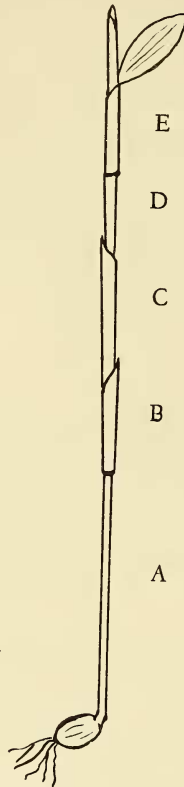


Fig. 1.—Diagrammatic representation of *Coix* seedlings: (A) Mesocotyl, this organ may elongate 450 mm; (B) coleoptile; (C) bladeless sheath, the node bearing this sheath is not shown but is within 1 or 2 mm of the node at the base of the coleoptile; (D) second internode; (E) first true leaf.

A number of experiments have been conducted, all giving the same results. When the mesocotyl is checked, the second internode elongates. A single experiment is presented in Table 1 where one-half of a flat of seedlings growing in the dark was given an exposure of 100 F.C. hours Mazda illumination, the other half remaining in the dark.

From the measurements it is evident that the illumination given one-half the seedlings resulted in a very great reduction in the elongation of mesocotyls and stimulated the elongation of second internodes. No effect of illumination is found in the coleoptiles, though a similar treatment of maize would have measurably increased the length of the coleoptiles. The bladeless sheaths, however, definitely responded

TABLE 1.—LENGTHS OF VARIOUS PARTS OF SEEDLINGS OF *COIX LACHRYMA-JOBI* L., HALF OF WHICH WERE GROWN WHOLLY IN THE DARK, THE OTHER HALF SUBJECTED TO A SINGLE EXPOSURE OF 100 F.C. HOURS MAZDA ILLUMINATION WHEN 2 TO 5 CM TALL.

Character	Light exposure		Difference
	Dark throughout	100 F.C. hours	
	<i>Mm</i>	<i>Mm</i>	<i>Mm</i>
Mesocotyl.....	253.71 ± 8.94	133.41 ± 7.90	120.30 ± 11.93
Coleoptile.....	30.32 ± 1.33	30.27 ± 1.11	.05 ± 1.74
First sheath.....	40.87 ± 1.41	56.30 ± 1.75	15.43 ± 2.25
Second internode.....	—	54.19 ± 3.78	—
First true leaf.....	82.56 ± 6.33	144.96 ± 6.71	62.40 ± 9.22

to the brief illumination. Evidently the mesocotyl of *Coix* is much more sensitive to light than is the maize mesocotyl, although this has not been tested beyond the reduction in length effected by 100 F.C. hours. In maize it has been possible to detect the effect of 1,000 F.C. seconds, and it would appear to be possible with *Coix* to measure the response to even smaller amounts of light.

The failure of *Coix* to elongate the internode between the coleoptile and the bladeless sheath is suggestive that this sheath and the coleoptile are more intimately related in function than is the case with maize. The greater sensitivity of *Coix* to light, as compared with maize, and the extensive elongation of *Coix* mesocotyls, together with the close physical association of the coleoptile and bladeless sheath, suggests that both these latter organs produce the growth substance required for mesocotyl elongation.

ZOOLOGY.—*Ostracoda from Puerto Rican bromeliads*.¹ WILLIS L. TRESSLER, University of Maryland. (Communicated by WALDO L. SCHMITT.)

It has been about 60 years since the first discovery of Entomostraca in the leaf cups of bromeliads in southern Brazil. Since then this habitat has been investigated in several places, and a long list of animal forms has been assembled, many of which are found almost exclusively in this peculiar situation.

The bromeliads are large tropical plants built on the lines of a century plant or the pineapple, which is a member of this group. The leaves, which may be several feet in length, are arranged in a spiral fashion with overlapping bases, which form little cups in which rain water collects. Bromeliads are mainly epiphytic on the large trees of tropical America but are found also in most botanical gardens of

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